Conservation Assessment for Ice Thorn (Carychium exile)

(Taft, 1961)

USDA Forest Service, Eastern Region

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This Conservation Assessment was prepared to compile the published and unpublished information on the Ice thorn. It does not represent a management decision by the U.S. Forest Service. Though the best scientific information available was used and subject experts were consulted in preparation of this document, it is expected that new information will arise. In the spirit of continuous learning and adaptive management, if you have information that will assist in conserving the subject community and associated taxa, please contact the Eastern Region of the Forest Service Threatened and Endangered Species Program at 310 Wisconsin Avenue, Milwaukee, Wisconsin 53203.

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EXECUIVE SUMMARY

Carychium exile (Ice thorn) is designated as a Regional Forester Sensitive Species on the Hoosier National Forest in the Eastern Region of the Forest Service. The purpose of this document is to provide the background information necessary to prepare a Conservation Strategy, which will include management actions to conserve the species.

The Ice thorn is a widespread land snail of forests in eastern North America. The species is cryptic due to its tiny size, which is less than 2 millimeters in height.

NOMENCLATURE AND TAXONOMY

Classification: Class Gastropoda
Order Soleolifera
Family Carychiidae

Scientific name: Carychium exile (Lea)

Common name: Ice thorn

Synonyms: Carychium exile exile
Carychium exile canadense

The synonyms above reflect the presence of two recognized subspecies (Hubricht, 1985). Carychium exile exile is the subspecies present on the Hoosier National Forest.

DESCRIPTURE OF SPECIES

This land snail is characterized by its minute size, with a maximum height of about 1.9 millimeters (figure 1). The shell is slender and long, whitish or clear, and thin. The spire is long, gradually tapering, the outlines convex and the summit obtuse (blunt). There are 5 – 5 ½ whorls present in the shell (Pilsbry, 1948; Taft, 1961; Burch and Jung, 1988).

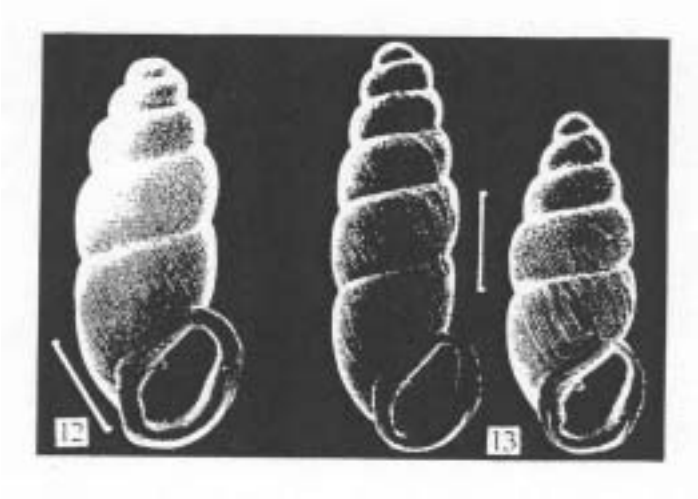

Figure 1. *The appearance of the shell of Carychium exile exile (#12) and Carychium exile canadense (#13). Measurement lines = 0.5 millimeters. (from Burch and Jung, 1988).*

LIFE HISTORY

Nothing is known of the life history of this species.

HABITAT

Hubricht (1985) lists the habitat of this species as "usually found in deep pockets of leaves on wooded hillsides and talus slopes, where leaves have blown up against the side of a log or in tree graves".

On the Hoosier National Forest the occurrence of Carychium exile in caves can be primarily attributed to the snail's presence in leaf litter that enters via sinkholes or sinking streams. If the preferred habitat remains continuous from a forest ravine into a cave entrance, a significant number of the snails may occur in the cave as far as leaf litter is present, representing a trogloxenic population. Instances in which only one or a few snails are present probably represent accidentals, rather than a troglophilic population as classified by Hobbs (1995). The species has been reported in sinkhole floors and the entrance zones of numerous caves in Alabama (Peck, 1989), Tennessee, Kentucky (Hubricht, 1964), Indiana (Lewis, 1997) and Illinois (Lewis, et al., 1999). It is probably a threshold trogloxene in caves throughout its range.

DISTRIBUTION AND ABUNDANCE

The subspecies Carychium exile exile occurs throughout the eastern half of North America, starting in the eastern Great Plains region from North Dakota to Oklahoma and extending continuously in all of the eastern states except Florida (figure 2). The subspecies Carychium exile canadense occurs in the northern tier of states from Minnesota to Maine, into Canada (Hubricht, 1985).

Hobbs (1995) assertion that the presence of Carychium exile in Indiana caves "extends the species geographical range significantly to the north" is spurious - Indiana is in the center of the wide range of this species.

In the Hoosier National Forest this species is known from subterranean habitats in Patton Cave and a pit on Frog Pond Ridge (both in the Deam Wilderness) and from Williams Cave (in the Tincher Special Karst Area). Hubricht (1985) reported it from numerous stations in Indiana and it undoubtedly occurs in deciduous forest litter throughout the Hoosier National Forest.

RANGEWIDE STATUS

Global Rank: G5, apparently secure; The global rank of G5 denotes a species that is widespread and common in many localities and is secure in its existence.

Indiana State Rank: S5 apparently secure; The state rank of S5 similarly denotes a species that is widespread and common in Indiana. In Indiana Carychium exile is in the center of its range and finds abundant woodland habitat. Its presence in the Hoosier National Forest and other Indiana karst areas is undoubtedly not a coincidence since it is calciphilic in nature.

POPULATION BIOLOGY AND VIABILITY

This is a common species of deciduous forest leaf litter. The habitat in which it occurs is abundant in eastern North America and sampling a square meter of leaf litter produced numerous snails (Lewis, et al. 1999).

POTENTIAL THREATS

As a threshold trogloxene, cave populations of this terrestrial snail are primarily vulnerable to activities that influence the entrance areas of caves. Although no survey has been conducted, Carychium exile is undoubtedly common in forest litter habitats throughout the Hoosier National Forest and would be impacted by any activity that modifies or destroys deciduous forest habitats. The primary threat to the caves inhabited by Carychium exile in the Hoosier National Forest is due to human visitation.

With the presence of humans in caves comes an increased risk of vandalism or littering of the habitat, disruption of habitat and trampling of fauna, introduction of microbial flora non-native to the cave or introduction of hazardous materials like spent carbide or batteries (Keith, 1988; Elliott, 1998, Peck, 1969). Due to its presence on the edge of a lake heavily used by recreational boaters, Patton Cave is particularly vulnerable to visitation by persons with no knowledge or awareness of the fragility of caves. On one of the visits to Patton Cave in 2001 to evaluate the fauna of the site (Lewis, et al., 2002) we encountered a group of people exploring the cave with flashlights and wearing bathing suits, accompanied by their dog.

Fire and smoke are potential sources of airborne particulate contamination and hazardous material introduction to the cave environment. Elliott (1998) reviewed the possible insecticide effects of cigarette smoke from cave visitors and the numerous harmful chemicals present in it (Feinstein, 1952; Howarth, 1983). Many caves have active air currents that serve to inhale surface air from one entrance and exhale it from another. Ashes in the entrance of Patton Cave attest to campfires being built there. This activity produces a dead zone due to the heat involved and alters the habitat as well as making smoke.

SUMMARY OF LAND OWNERSHIP ANF EXISTING HABITAT PROTECTION

On the Hoosier National Forest the species occurs in Patton Cave and Frog Pond Ridge Pot, which are both within the Charles C. Deam Wilderness. The Charles C. Deam Wilderness was congressionally designated and is "managed to promote and perpetuate the wilderness character of the land and its specific values of solitude, physical and mental challenge, scientific study, inspiration ad primitive recreation…" (USDA Forest Service, 1991).

The Williams Cave population is on privately owned land associated with the Tincher Special Area. Thus, the cave receives no protection, but is adjacent to land managed by the Hoosier National Forest.

From a practical standpoint Carychium exile is a surface species that occurs widely and undoubtedly inhabits a mosaic of federal, state and privately protected lands.

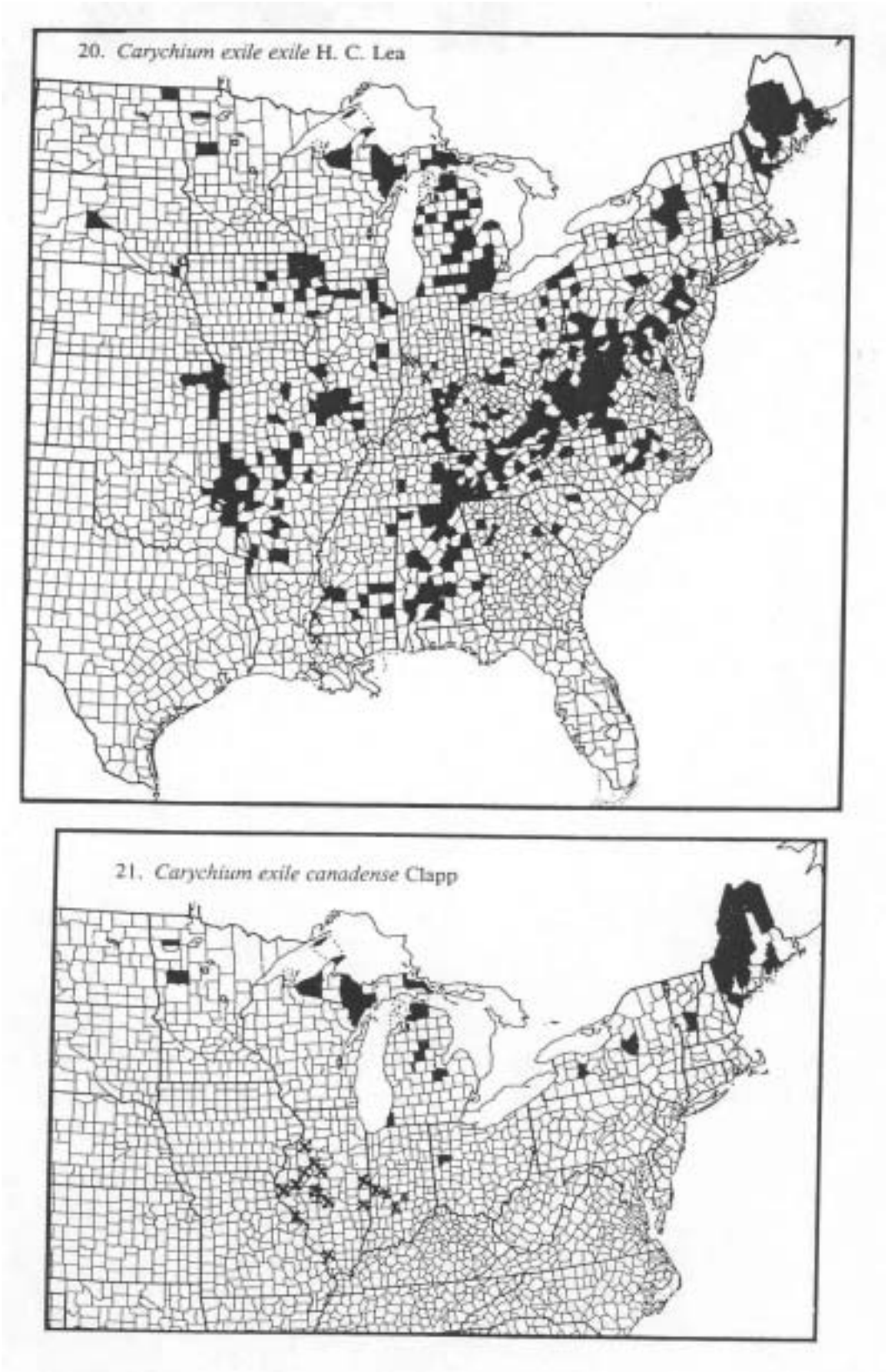

Figure 2. *Distribution of Carychium exile exile (from Hubricht, 1985).*

SUMMARY OF EXISTING MANAGEMENT AND CONSERATION ACTIVITIES

The two sites for Carychium exile are located on national forest system land within the Hoosier National Forest and occur in a wilderness area. No species specific management activities are being conducted for Carychium exile. Cave and karst habitat located on the Hoosier National Forest are, however, subject to standards and guidelines for caves and karst protection and management as outlined in the Hoosier National Forest Land and Resource Management Plan (Forest Plan) (USDA Forest Service, 1991). These standards and guidelines include the following:

> *Caves are protected and managed in accordance with the Federal Cave and Karst Resources Protection Act of 1988, Forest Service Manual 2353, Memorandums of Understanding between the forest service and the National Speleological Society, the Indiana Karst Conservancy, Inc., the Forest Cave Management Implementation Plan, and individual specific cave management plans.
>
> *Except where modified by an existing cave management prescription, vegetation within a 150-200 foot radius of cave entrances and infeeder drainages with slopes greater than 30 percent will generally not be cut. No surface disturbing activities will be conducted on any slopes steeper than 30 percent adjacent to cave entrances. Similar protection areas will be maintained around direct drainage inputs such as sinkholes and swallow holes known to open into a cave's drainage system of any streams flowing into a known cave.
>
> *Allow no sediment from erosion of access roads and drilling sites to wash into caves or karst features.
>
> *Seismic surveys requiring explosives shall not be conducted directly over known cave passages or conduits.
>
> *All caves will be managed as significant.
>
> (USDA Forest Service, 1991)

The forest plan includes a cave and karst management implementation plan. This management plan places an emphasis on cave resource protection and mitigation. Understanding of the caves is established through mapping, bioinventory, cataloging of resources (e.g., archaeological, paleontological, speleothems, etc.), and estimating use levels and trends. Protection zones or other mitigation measures recommended by a management prescription will be established around caves entrances, sinkholes and swallowholes. Specific criteria will include consideration for protection of entrance and cave passage microclimate, animals inhabiting the cave, physical and chemical parameters and aesthetic values associated with the cave.

RESEARCH AND MONITORING

The presence of this snail in caves on the Hoosier National Forest was noted by Hobbs (1995) as a result of a cave resource inventory. A bioinventory of caves of the Hoosier National Forest is being conducted by Lewis, et al. (2002; and in progress).

RECOMMENDATIONS

This is a secure, widespread species that occasionally occurs in caves. It should be considered for removal from the Regional Forester's list of Sensitive Species.

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